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THE LOGISTICS LESSONS OF THE GULF WAR:
A SNOWBALL IN THE DESERT?

by

Keith M. Wilkinson

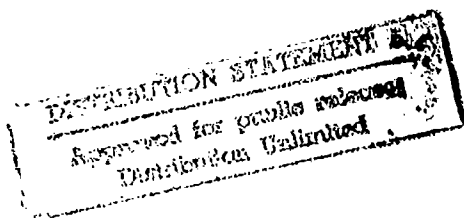
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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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Abstract of
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The experiences of the U.S. military during Desert Shield/Desert Storm are analyzed to determine whether they provide lessons on logistics support for contingency operations which, irrespective of the size of force or theater of employment, are applicable to commanders at the operational level. The scope of discussion is limited to those aspects of logistics which the commander could affect in the near-term. As an introduction to the discussion, logistics activities during the Gulf War are examined in light of Eccles' principle of the "Logistics Snowball" and, although some manifestations were in evidence, the conclusion reached is the majority are simply part of the cost of war on the modern battlefield. Appropriate lessons are highlighted in the areas of planning, deployment, and sustainment. A brief review of current joint doctrine publications reveals these lessons are adequately addressed within existing guidance. The conclusion is that more effective logistics support is possible through application of the lessons but that the process, like much in the art of war, is dependent to a large extent upon the skill of the commander and his staff.

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THE LOGISTICS LESSONS OF THE GULF WAR. A SNOWBALL IN THE DESERT?

CHAPTER I

INTRODUCTION

Before a commander can even start thinking of maneuvering or giving battle, of marching this way and that, of penetrating, enveloping, encircling, of annihilating or wearing down, in short of putting into practice the whole rigmarole of strategy, he has --or ought -- to make sure of his ability to supply his soldiers. . . .

-- Martin Van Creveld¹

What experience and history teach us is this -- that people and governments never have learned anything from history, or acted on principles deduced from it.

-- Hegel²

Throughout history the concept espoused by Martin Van Creveld in his classic work Supplying War--that operational planning ought to be guided by logistical realities-- has often escaped military leaders. As a result, Hegel's fairly pessimistic appraisal of man's ability to learn from past experience seems well supported in this area. Armed with our recent experiences during Operation Desert Shield/Desert Storm, however, the opportunity presents itself to break this unfortunate historical chain. In light of the changing "strategic landscape" and the shift in the nation's military focus to reflect the likelihood of increased involvement in regional contingencies, it seems appropriate to search for lessons from the Gulf which, rather than being theater-specific, are applicable to the operational-level commander across a broad spectrum of future scenarios.³ While dismissing the more long-range aspects, such as design and acquisition of hardware, as beyond the scope of this analysis, an examination of the logistics support provided during Desert Shield/Desert Storm highlights several lessons which deserve careful consideration in the future.

To provide a basic foundation from which to evaluate the complexities inherent in the modern logistics support structure, Chapter II begins with a brief discussion of the

principle of the "Logistics Snowball" developed by Henry Eccles. After a look at several apparent manifestations which occurred during the course of the conflict, the paper examines whether the phenomenon can be avoided in modern warfare. Chapter III centers on the lessons drawn from U.S. Central Command's (CENTCOM) experiences during planning efforts, the deployment phase, and the sustainment of forces once in-theater. Chapter IV consists of a brief look at the guidance on logistics contained in current joint doctrine publications to determine whether it provides the operational-level commander with an adequate framework to address the previously highlighted lessons. This incorporation of experience into doctrinal guidance is a necessary step on the road to proving Hegel's pessimistic view itself, is history.

CHAPTER II

THE LOGISTICS SNOWBALL

Prior to the rapid advancements in technology experienced during the last century, referring to logistics as "that branch of the military art which embraces the details of the transport, quartering, and supply of troops in military operations" addressed a fairly limited range of actions and services.¹ While the actual accomplishment of the actions and provision of services was certainly not without difficulties, the scope was narrow. Technological advances complicated the logistics equation, as pointed out by Charles Shrader in U.S. Military Logistics 1607-1991:

The radio, the airplane, and the motor vehicle all required specialists to operate and service them. For example in 1917 the U.S. Army Quartermaster Corps had four different types of units; by November 1918 the Quartermaster Corps in France alone had 26 distinct types of units and another six awaiting approval. In France by 15 December 1918 there were 706 Quartermaster Corps depot, supply, refrigeration, laundry, sterilization and bath, gasoline supply, graves registration, salvage, remount, and repair units, each with specialized equipment and specially-trained personnel.²

This trend, continuing unabated through World War II, Korea, and beyond prompted Henry Eccles, in 1965, to formulate his principle of the "Logistics Snowball" in an attempt to communicate the danger posed by this burgeoning logistics structure. He postulated "that all logistics activities naturally tend to grow to inordinate size, and unless positive control is maintained this growth continues until, like a ball of wet snow, a huge accumulation of slush obscures the hard core of essential combat support and the mass becomes unmanageable."³ The real concern, as he saw it, was that the "unnecessary supplies and personnel block the flow of the necessary resources. Thus it directly damages combat effectiveness."⁴

When Saddam Hussein ordered his forces across the Kuwaiti border in August of 1990, he set into motion a chain of events that would witness the most rapid and massive buildup of U.S. forces overseas since World War II. That logistics capabilities played a key role in that

buildup is unquestionable. At the same time, the results produced by those forces during Desert Storm, in conjunction with their Coalition partners, leave little doubt as to their combat effectiveness. Post-war analysis of the logistics support structure, however, might lead a naturally suspicious observer to conclude that the "Snowball" was much in evidence in the desert. Many might cite the prodigious size of the support elements:

- the Army's Support Command (SUPCOM) staff eventually consisted of more than 750 personnel⁵
- 2d Corps Support Command (COSCOM), the support arm of VII Corps, numbered over 24,000 soldiers⁶
- the 7th Transportation Group (Terminal) was the largest brigade in the Army, with nine battalions and over 9,200 soldiers⁷
- the Army deployed 72 percent of its truck companies in support of 25 percent of its combat divisions⁸
- the Marine Corps combat service support area (CSSA) Khanjar, constructed to support the breaching of Iraqi defenses at the outset of the ground campaign, was the largest in Corps history with 24 miles of blastwall berms and covering 768 acres⁹

Perhaps a more telling description comes from General Schwarzkopf himself in describing the arrival of Air Force fighter aircraft in-theater:

The squadrons of F-15 and F-16 fighter planes it [the Air Force] had promised flowed to Saudi Arabia wonderfully--a little ~~too~~ wonderfully, it turned out, because at the end of the first week we had not the five squadrons I'd expected, but ten. In a way, that was terrific: the safety of our arriving forces depended heavily on those fighters. . . . But each twenty-four-plane squadron also required more than fifteen hundred engineers, technicians, and armorers. Moving all those people and their equipment tied up dozens of flights we had allocated for other units.¹⁰

Since CENTCOM relied on the support of the other Unified and Specified commands to provide it with the forces necessary to accomplish its mission, General Schwarzkopf, as Commander-in-Chief (CINC), had good reason to be concerned with anything that delayed the arrival of his combat forces.

While there can be little argument that the "Logistic Snowball" as described by Eccles is a substantial concern for the operational commander, the question to be resolved is whether, in today's technology-dependent military, it can really be avoided. While every effort should be made to prevent the movement of "unnecessary supplies and personnel", identifying

what is unnecessary is increasingly difficult. Schwarzkopf went to the extreme in the case of the initial Desert Shield deployments by purposely delaying support units in an effort to maximize combat power in-theater as quickly as possible.¹¹ Although it served its purpose initially, as will be seen later in the paper the decision ultimately led to problems once troops and materiel began arriving in the Gulf. Care must be taken not to automatically equate growth in the size of the support structure with degradation of combat effectiveness, a mistake made all too often in the familiar "looth-to-tail" debate. Van Creveld sums up the key to comparing the proportion of service to combat formations:

This proportion is frequently cited as a rough indicator of an army's efficiency-- a low proportion representing a high efficiency. But this is to misunderstand the relation of service to combat units. Romantically heroic politicians and gung-ho generals notwithstanding, the aim of a military organization is not to make due with the smallest number of supporting troops but to produce the greatest possible fighting power. If, for any given campaign, this aim can only be achieved by having a hundred men pump fuel, drive trucks and construct railways behind each combatant, then 100:1 is the optimum ratio.¹²

The scope of the campaign, the environment, suspected enemy capabilities, timing, and existing infrastructure all combined to influence the logistics system which supported Desert Shield/Desert Storm. Similar factors will shape logistics requirements in future campaigns. While some inefficiencies were bound to occur in supporting an operation the size of that in the Gulf, the "Snowball" of unnecessary supplies and personnel was small. The key to minimizing its effect was prior planning.

CHAPTER III

THE LESSONS

In attempting to develop lessons from a particular operation, the most important task is determining the purpose. If the exercise is done in the expectation of employing the same forces, in the same area, against the same enemy sometime in the future, a number of specific lessons become readily apparent. If, however, the intent is to develop lessons which have a general application to any operational commander, regardless of scenario, the task becomes more difficult. It is, therefore, not surprising that the lessons detailed below involve aspects of logistics which have always presented challenges to commanders. The terms may have changed over the years and the means of accomplishing them may have improved in step with technology, but the areas of planning, deployment, and sustainment still hold the keys to success in military operations.

Planning

It seems somewhat strange that one of the crucial lessons to be learned from Desert Shield/Desert Storm involves an operational plan that was, for all intents and purposes, still conceptual. While a complete discussion of the deliberate planning process is outside the scope of this paper, it is beneficial to review a few key points. The document that provides the CINC with his roles and missions under the National Military Strategy and focuses his regional planning efforts is the Joint Strategic Capabilities Plan (JSCP). Within the JSCP the CINC is tasked, among other things, to prepare operational plans (OPLAN) for the most likely wartime scenarios within his theater. Once the CINC has drafted a concept for an assigned OPLAN, the concept is evaluated for logistics and transportation feasibility. Only after it has been proved viable for these considerations is the plan submitted for final approval to the Joint Staff.

Since its inception in 1963, CENTCOM had been tasked with planning for the protection of Iranian oilfields from the Soviets in the event of war.¹ The scenario was conceived in the Cold War era and was still the primary tasking of CENTCOM in 1988 when General Schwarzkopf took command. After several personal visits to the Gulf region, he recognized in July of 1989 that the most likely threat to regional stability was not posed by the Soviets:

Nobody but a few stubborn hard-liners believed we'd go to war against the Soviets in the Middle East. Each day brought confirmation of arms-control talks succeeding and cold war tensions easing. . . . So I asked myself, what was most likely? Another confrontation like the tanker war, one that had the United States intervening in a regional conflict that had gotten out of control and was threatening the flow of oil to the rest of the world. I counted up no fewer than thirteen current conflicts in the region--border wars, civil wars, tribal wars, religious wars--and any one of several could endanger our interests. Therefore, Central Command had to develop an operating plan to cope with the worst of these conflicts. . . . What was the worst case? Iraq as the aggressor. . . .²

Based on this assessment of the situation he had his planners draw up an OPLAN for a scenario where Iraq invades Kuwait and threatens Saudi Arabia. By using the draft plan in CENTCOM's annual war game, Internal Look, in July of 1990, the staff and component commanders were exposed to many of the problems they would encounter the following month in the strikingly similar real-world events of Desert Shield/Desert Storm.

The lesson in this instance is drawn from General Schwarzkopf's unwillingness to accept the JSCP version of where he, as the CINC, should place his priorities. With the increased stature given to the Combatant Commanders by the Department of Defense Reorganization Act of 1986, the CINC is expected to be the military expert for his area of responsibility. While the JSCP continues to provide planning guidance, the emphasis on adaptive planning provides increased flexibility in preparing responses to a wide spectrum of threats. Although not all will present the same logistics challenges as Desert Storm, prior planning will help to minimize the number of surprises in execution. A note of caution must be interjected at this point concerning blind reliance on plans, no matter how detailed they may be. As Van Creveld points out in his discussion of "Operation Overlord"

during World War II

In spite, or perhaps because, of the fact that the plans for "Overlord" made detailed provisions for the last pre-packed unit of fuel, they quickly turned out to be an exercise in conservatism, even pusillanimity, such has not often been equalled. Not only did the actual development of the campaign have little in common with the plans, but the logistic instrument itself functioned very differently from what had been expected. Consequently, it would hardly be an exaggeration to say that the victories the Allies won in 1944 were due as much to their disregard for preconceived logistics plans as to their implementation. In the final account, it was the willingness--or lack of it--to override the plans, to improvise and take risks, that determined the outcome.³

The ultimate value of planning is in having considered the myriad of details required for supporting a possible scenario in advance and in having explored the available solutions. That "friction" and the "fog of war" may require flexibility in execution does not negate this value.

Deployment

Another key lesson to be drawn from our Desert Shield/Desert Storm experience is based upon the realities of the current world situation. For some time now the geographic location and military power of the United States have combined to reduce the threat of invasion or attack of our territory by the conventional forces of a potential enemy to almost zero. Our forces, therefore, have been primarily organized, trained, and equipped to project military power abroad in support of national objectives. In the past we maintained a significant element of our forces forward deployed at military installations around the world. The level of our presence depended upon the threat and the willingness of other countries to allow our forces on their soil. As mentioned earlier, CENTCOM was to a certain extent unique among the commands in that political sensitivities within its area of responsibility precluded the permanent basing of all but a token naval presence. It therefore relied upon other commands to provide forces in support of its mission in time of conflict. Consequently, the operational plans called for the ability to rapidly deploy these forces when tensions increased in the region. Depending on the level of the threat, strategic airlift, sealift, and prepositioned supplies/equipment were counted on to deliver those

forces. Since any operational commander, from the CINC of a Unified Command to a Joint Task Force commander, will in varying degrees rely on these same assets, it is beneficial to examine CENTCOM's experience.

Strategic Airlift

Inherent in all aerospace forces are the attributes of speed, flexibility, range, and versatility.⁴ Strategic airlift brings these attributes to the arena of delivering troops, supplies, and equipment. When Iraq invaded Kuwait and President Bush elected to initiate CENTCOM's plan for the defense of Saudi Arabia, airlift assets were immediately mobilized to begin deployment of the critically needed ground combat forces and supporting air assets. Within two days elements of the 82nd Airborne Division's ready brigade were in-theater; after 22 days the entire division was in Saudi Arabia.⁵ More material was moved in the first six weeks than was moved in the entire Berlin Airlift, which lasted for more than a year.⁶ In addition, troops and light equipment from two Marine Expeditionary Brigades (MEB) were airlifted from Hawaii (1st MEB) and California (7th MEB) to marry up with their prepositioned equipment. The 7th MEB was in position and capable of sustained combat within eight days.⁷ By the end of December 1990, the airlift effort had logged over 9,000 sorties and delivered 303,919 tons of supplies, 304,859 troops, and 400 tanks.⁸ When the deployment effort was at its peak, over 120 planes per day arrived at airfields in Southwest Asia--almost one arrival every eleven minutes, 24 hours a day.⁹ These figures attest to the speed with which airlift forces can react in a crisis situation. The primary drawback to these forces is their limited numbers. Due to the expense of acquiring, maintaining, and operating the airlift fleet, we will never possess these assets in sufficient numbers to handle more than a small percentage of our lift needs. Even though the previously mentioned cargo figures are impressive in themselves, they represent only about one tenth of the total tonnage ultimately shipped to the theater.¹⁰ That level of effort also required the call-up of the reserve component forces and activation of the Civil Reserve Air Fleet, both steps that could only be expected for a contingency of similar magnitude in

the future. An airlift effort of that size also depends upon a fairly well developed infrastructure of airfields in the theater, a topic which will be covered in greater detail under the area of Sustainment. In addition, enroute staging bases in Europe and the Mediterranean were a critical element in our ability to deliver the necessary troops and cargo.

Strategic Sealift

While airlift provided the initial surge of troops and supplies for the defense of Saudi Arabia, countering a determined assault by Iraqi forces across the Saudi border required heavy ground forces. CENTCOM had such forces apportioned to them but to deploy them across the 8,700 miles of ocean from the United States where they were based required far greater capacity than the limited airlift forces could provide. As in World War I, World War II, Korea, and Vietnam, strategic sealift hauled the vast majority of inter-theater cargo. Ultimately, 385 ships ranging from modern Roll-on/Roll-off (Ro-Ro) and container vessels to old breakbulk freighters were involved in the effort.¹¹ The first to be called into action were the military's dedicated Fast Sealift Ships (FSS), kept in a ready status at various ports on the U.S. east and gulf coasts. Required to be crewed and under way within 96 hours of alert and capable of sustained operations at 33 knots, these seven ships (a total of eight exist, but one had mechanical problems which kept it from delivering any cargo during the war) carried the same amount of cargo as 116 World War II "Liberty" ships. The first of these was off-loading cargo in the Persian Gulf only 20 days after activation.¹² As with airlift, this level of sealift support was also highly dependent on Saudi Arabia's modern port facilities to provide the necessary services.

In addition to the FSS fleet, the decision was made to activate elements of the Ready Reserve Fleet (RRF). An assorted mix of vessel types kept "mothballed" at various locations in the U.S., most were programmed to be available for service within five days of call-up. Due to the suitability of the Ro-Ro design for transporting military equipment, all that were in the RRF were activated. In addition, seven more were chartered from the U.S. merchant

fleet and by the end of hostilities 27 others had been chartered from foreign carriers.¹³ While most of the newer vessels in the fleet were activated with little trouble, many of the older breakbulk ships had trouble meeting the programmed availability dates. Final results show that less than half of the total RRF activated met the dates.¹⁴ This translated into delays in loading and delivery of urgently needed equipment in the Gulf. As the Desert Shield defensive forces began to be augmented with, among others, the VII Corps from Europe in preparation for the Desert Storm offensive, this delay in sealift delivery became more pronounced:

The goal was to have the soldiers wait in temporary quarters in the port area no more than two or three days before linking up with their equipment. However, a very efficient airflow coupled with ship breakdowns and delays led to a growing time gap between the arrival of personnel and equipment. The waiting time stretched to more than two weeks and caused a buildup of about 300,000 soldiers in port waiting areas, far in excess of the planned 12,000 to 15,000, greatly straining accommodations, security measures, and transportation.¹⁵

The delays also prompted many ships to be administered as heavily loaded vice the more appropriate, yet less space efficient, combat load. This further added to delays at the receiving end as units attempted to locate equipment that was spread between a number of ships.¹⁶

As previously mentioned, for the operation to be necessary to transport much of the cargo due to a lack of available U.S. shipping. In fact, over half of the vessels used during the entire operation were of foreign registry.¹⁷ This figure is simply a reflection of the reality that, due to the decline in this country's merchant shipping industry, less than four percent of our commercial trade is carried on U.S. ships. As a result, available manpower in the U.S. maritime industry has decreased by close to 60% since 1970.¹⁸ The situation is no better for our close ally Great Britain, where "the merchant navy has been allowed to run down to the extent that a Falklands-type operation might be impossible to repeat, without using ships under flags of convenience."¹⁹ General Johnson, then CINC of TRANSCOM, summed up the concern this raises:

Our ability to lift more than ten million tons of material by sea in seven months

of operations to the Persian Gulf region has . . . depended heavily on the contributions of organic, allied, and friendly shippers. In the future, however, we may find ourselves in a contingency that may require us to accomplish a deployment by relying on a mix of U.S. sealift resources. One of our greatest concerns, then, is the state of the U.S. maritime industry.²⁰

Prepositioning

While the sealift effort from U.S. and European ports eventually delivered the majority of supplies and equipment used by forces in the Gulf, even the fastest of these ships, the FSSs, could not deliver the first load until 20 days after alert. The need for a more rapid means of deploying a capable element of heavier forces into the theater had been recognized in the early 1980s. As part of a \$7 billion program begun in 1984, the U.S. military procured thirteen maritime prepositioning ships (MPS) and eleven afloat prepositioning ships (APS). These ships, which support the Marines (MPS) and Army/Air Force (APS), were designed to be pre-loaded and forward deployed for rapid response.²¹ The MPS ships, organized as three squadrons, were located at Diego Garcia, Guam, and the east coast of the U.S.. In response to the Iraqi invasion, the squadron at Diego Garcia was alerted and delivered its cargo of M-60A1 tanks, support vehicles, and supplies to waiting members of the 7th MEB at the Saudi Arabian port of Jubail only eight days later.²² The firepower and mobility of these forces were a welcome addition to the lightly armed airborne troops already in place.

The Air Force had also taken advantage of the prepositioning concept in previous years. In addition to three APS ships, supplies and equipment had been positioned in warehouses at five land-based sites:

This material included the bare base kits required to begin operations from air strips as sparse as unused sections of highway, reverse-osmosis water purification units, vehicles of all types ranging from specialized flight line loaders to fuel trucks, food rations in the form of meals ready to eat, munitions, and petroleum, oil, and lubricant supplies. Prepositioned material proved to be a wise investment, for having the supplies in-theater saved the equivalent of eighteen hundred airlift missions and provided supplies and infrastructure material for twenty one of the principle fields.²³

Deployment Lessons

The latest version of the National Security Strategy of the United States, released in

January of 1993, states that "global security is threatened by regional instabilities which we may have to confront either to protect our own citizens and interests or at the request of our allies or the United Nations."²⁴ General Schwarzkopf experienced firsthand the challenges which accompany the employment of forces at extreme distances from the United States. The discussion of the deployment of forces in support of Desert Shield/Desert Storm was not intended to be an advocacy presentation for one mode of transportation over another. While inherent strengths and weaknesses exist in both airlift and sealift, the operational commander will ultimately find the available lift a given when a crisis develops.

The lessons to be taken from the Gulf War experience are more basic. First, there will never be enough lift available to place troops and equipment in position as quickly as the operational commander would like. The shrinking budget and force downsizing should ensure that remains true. At the same time, what lift is available might not be dedicated solely to a particular commander or area of conflict. How much more difficult would the deployment to the Gulf have been if trouble had developed in South Korea? If it took us seven months to prepare for the offensive with 94 percent of the C-5 force, 73 percent of the C-141 force, and eighty one percent of the KC-10 force, as well as over 300 ships, dedicated solely to that effort, how much longer would it have taken if half those assets had been diverted to another regional contingency?²⁵

The Gulf War might be considered an exception to the type of contingency we can expect in the future. Certainly the Iraqis possessed a far more potent military than the average Third World country. Some might argue that the need to deploy our heavy forces in the strength we did over similar distances is unlikely to occur again. Yet, of the 29 countries that currently possess more than 1,000 tanks, close to half of them are judged to pose a potential threat to our national interests.²⁶ The bottomline is the operational commander needs to be aware of the potential threats, consider the forces necessary to counter them, and, accepting the limitations on available strategic lift, determine his ability to receive those forces with the existing infrastructure. These logistical realities will then focus his

operational planning and determine his available options.

Sustainment

In the context of this paper, the definition of sustainment is "providing consumable supplies and replacement equipment to the deployed forces."²⁷ At the operational level the commander, whether of a Unified Command or a Joint Task Force, is concerned with ensuring his component commanders have the means to sustain their forces during the implementation of his operational concept. In viewing the scope of the offensive plan envisaged for Desert Storm, this meant sustainment efforts on a massive scale. A typical armored brigade consumes nearly 1,200 short tons of supplies during a single day in combat.²⁸ At the Corps level that translated into 425 truckloads of ammunition and 440 truckloads of fuel per day.²⁹ Just multiplying the water requirements, calculated at 25 liters per person per day, by the hundreds of thousands of troops in-theater provides some measure of the level of the sustainment challenge.³⁰

To enable the service components to carry out their sustainment functions, the operational commander focuses on the logistical "big picture". In that light, CENTCOM's major hurdles came in the areas of infrastructure, Host-Nation Support/Assistance-In-Kind, logistics support troop levels in-theater, and intra-theater transportation.

Infrastructure

As stated during the discussion of deployment lessons, CENTCOM benefited greatly from the well developed air and sea port system within Saudi Arabia. The major coastal roads and those between major cities were excellent. In the interior of the country, however, roads and rail systems were inadequate for the volume of traffic involved and required extensive upgrading prior to the massive movement to the west in preparation for the ground assault.³¹ With few interior cities or towns to serve as depots, forward supply areas were constructed from barren desert to support offensive operations:

ARCENT established six sites to sustain the XVIII Airborne and VII Corps. In the I MEF area, four CSS areas were set up near the Kuwait border. All forward sites

were stocked with bulk potable water, both bottled and from reverse-osmosis water purification units, ammunition, equipment, food, petroleum, construction materials and spare parts for delivery forward as needed.³²

In summary, Saudi infrastructure contributed immensely to our ability to rapidly move troops and sustainment supplies into the theater but distribution within the country was hindered by lack of adequate surface transportation routes and base areas.

Host Nation Support (HSN)/Assistance-In-Kind

Once a decision was made by Saudi Arabian leadership to request U.S. assistance, they were extremely willing to provide support for coalition forces. The problem encountered by CENTCOM was that until that time there had been very little attempt to set up mechanisms for the distribution of that support. As a result, the HSN effort required a great deal of negotiation and coordination in the early stages. As related by one of the negotiators who arrived only days after the Iraqi invasion:

When we arrived there was no logistics structure at all. From a logistics standpoint, this was the worst nightmare, in that we were 8,000 miles from home and there were no permanent [U.S. operated] air bases over there, or [U.S. operated] army bases or anything. . . . We'd never been allowed to go in there to do any site surveys or market surveys, so we really went in blind. . . . We had no idea who to buy from or what was available, so we basically had to start from scratch.³³

With the limitations on strategic lift and the time constraints CENTCOM was under initially to field a credible defensive force, being able to procure goods and services off the Saudi Arabian economy was vital. The commander of U.S. Army Materiel Command at the time, General Jimmy D. Ross, stated, "The next time we go into a country, the second person that hits the ground should be a host-nation support officer and the third a contracting officer. We're going to use every facility and piece of equipment that we can get from the host country."³⁴

Once the necessary agreements were in place, the Saudi government quickly made good on their promises of support. A partial listing of their contribution to the effort included:

. . . approximately 4,800 tents; 1.7 million gallons of packaged petroleum, oil, and lubricants; more than 300 heavy equipment transporters (HETs); about 20 million meals; on average more than 20.5 million gallons of fuel a day; and bottled water for the entire theater.³⁵

While the details of the HNS agreement were still being worked out, U.S. personnel were obliged to contract for support with restricted funding. Any purchase over \$200,000 required congressional approval, a process which proved unmanageable when virtually every contract negotiated fell above that limit. The commitments of financial support from our allies proved invaluable in overcoming this obstacle. As General Schwarzkopf explained:

Had it not been for the Japanese, Desert Shield would have gone broke in August. While Western newspapers were complaining about Tokyo's reluctance to increase its pledge of one billion dollars to safeguard Saudi Arabia, the Japanese embassy in Riyadh quietly transferred tens of millions of dollars into Central Command's accounts. We were able to cover our day-to-day operations before anybody in Washington could lay claim to the money.³⁶

Support Personnel Levels In-theater

As mentioned previously, General Schwarzkopf made a decision early in the Desert Shield deployment to delay the arrival of support personnel to ensure maximum combat forces on the ground at the earliest possible date. A decision born of necessity, it soon became apparent that further build-up in the theater in preparation for Desert Storm would require additional support units. Those already in-theater had worked virtually uninterrupted since their arrival and were physically incapable of moving the additional units into position without help. VII Corps, in particular, had long relied on substantial HNS within the European theater. In order to operate in the more austere environment of the Gulf, they needed additional signal, medical, transportation, and engineer support.³⁷ In addition, units such as the Marine MEBs who had deployed earlier had arrived with supplies for only 30 days. In order to ensure the logistics system could support these increased requirements, additional units were deployed. Impacting on this area was the fact that the majority of combat service support units in the Army belong to the reserve components and additional call-up authority was required.³⁸

Transportation

Although the operational commander should find the forces assigned to him prepared in terms of equipment necessary to perform their mission, there are times when the

assumptions of service doctrine run contrary to the scope of the commander's operational concept and the realities of theater geography. Such was the case in Desert Storm. There are roughly 1500 tracked combat vehicles in a heavy division. That same division is equipped with only 24 heavy equipment transporters (HETs), designed to carry even the largest tanks. The Army envisioned the division's tracked vehicles travelling under their own power for most maneuvers and the HETs being used to transport damaged vehicles to the rear for repair.³⁹ The "Hail Mary" envelopment plan for opening the ground offensive required the equivalent of 17 divisions to move hundreds of miles from their defensive positions in the east in the span of two weeks. To cut down on the wear-and-tear on vehicles, more transportation was needed. One heavy division required 3,223 HET, 445 lowboy, and 509 flatbed loads to move into position.⁴⁰ The following describes the resulting search for vehicles:

Realizing that there was not enough heavy lift and linehaul transportation assets in-theater to support two corps, an immediate call went out to the world to ship trucks to Saudi Arabia. . . . The world responded. The theater began receiving numerous trucks from all over the globe, including TATRA and MANN trucks from Germany, Czechoslovakian HETs, Italian Fiat trucks, and U.S. Macks and Peterbilts to name a few. . . . Eventually the group was to command and control 1,985 trucks that drove approximately 1.4 million miles per week.⁴¹

With the demand for more trucks came a need for more drivers. In order to fill the void many of the troops from the light divisions deployed early in Desert Shield became truck drivers for Desert Storm in support of the heavy forces.⁴²

Even with this increased transportation capability, the Army relied heavily upon intra-theater airlift to support the build-up. During the height of preparations for the offensive, C-130s were landing at forward airstrips every ten minutes, 24 hours a day, delivering priority equipment and additional troops.⁴³

Sustainment Lessons

The scope of the commander's operational concept is limited by his ability to keep the troops in the field supplied and equipped. The better that ability is, the more options available to him in terms of possible strategies. Therefore, as the commander explores the

various options available to achieve his objective he must consider the limitations imposed by the infrastructure within the region. In the case of a CINC contemplating OPLAN scenarios, he may have the opportunity, over the course of time, to improve on the current situation. For a Joint Task Force commander, responding to a contingency, the existing conditions may dictate the scope and pace of operations.

As demonstrated in Desert Shield, after the crisis begins is too late to be negotiating agreements for host-nation support. That the Coalition forces ultimately had six months to build up forces is not something any prudent commander should count on in the future. The lesson here is, once again, one of forethought. In light of the limitations on available lift, the ability to rely upon sources in-theater for supplies and services is a force multiplier. Whether a particular country is willing to enter into such agreements on the basis of a potential threat may be problematic, but the potential benefits are worth the effort.

The trade-off between support forces and combat forces, discussed both in this section and in examining the "Logistics Snowball", presents the commander with a paradox. While each support troop deployed means one less combat soldier based on our limited lift situation, there is a point when size and length of the deployment combine to create a problem if the support contingent is not large enough. Supplies and equipment back up at the ports, vehicles run short of fuel, and soldiers get hungry. The operational commander must evaluate the sustainment requirements of his forces carefully before deciding whether a reduction in this area is warranted.

Finally, it became apparent fairly quickly during the Gulf War that the Army's concept on the use of HETs, developed for the European scenario, was inappropriate in a theater with a poor road system in the interior and vast stretches of desert to cover simply to reach the intended attack positions. While few potential trouble spots combine the same features, the lesson for the commander is not geographically specific. Being familiar with service doctrine--their belief as to the best way to employ their forces--allows the commander to ensure it is appropriate for his theater of operations. If modifications need to be made, it is

better to know that up front rather than to expect to employ forces in a particular way and find it can't be done.

A Further Note of Caution

In examining the logistics lessons of Desert Shield/Desert Storm, an attempt has been made to discuss those with relevance outside the context of that conflict. While the point was made in the introduction that military leaders often fail to learn the lessons of history, it is equally true that often the wrong lessons are learned. As Terence Berle points out in his article, Be Wary of Revisionism:

It is appropriate that Desert Shield/Storm be examined in excruciating detail to substantiate successes which can be incorporated into logistics doctrine and to identify problems which must be worked. In both cases, however, the political, economic, and military strategy and tactics that affected the results must be noted so we do not try to duplicate a success from one environment into a totally different environment.⁴⁴

CHAPTER IV

LOGISTICS AND JOINT DOCTRINE

It seems appropriate, having examined the Gulf War experience and distilled some lessons for consideration by operational commanders, to look at the guidance relating to logistics contained in the current series of joint publications. While the majority of these publications are still in the test phase, they are available to the commander and his staff as an aid in employing joint forces effectively. As mentioned in the previous chapter, doctrine is what we consider to be the best way to employ forces. Based on new experiences, doctrine may need to be revised. The intent of this chapter is to compare the lessons learned with the published doctrine to see whether such an evolution is again necessary. While the joint publication series is extensive, this analysis will focus specifically on Joint Pub 1, JCS Pub 3-0, and Joint Pub 4-0.

Joint Pub 1: Joint Warfare of the U.S. Armed Forces

This cornerstone of the joint publication series provides a broad overview of how the U.S. military builds an effective joint team. While perhaps intended for an audience below operational-level commander, it does cover several aspects of the lessons presented in this paper. In addition to mentioning the importance of an efficient transportation system to our ability to project military power¹, it emphasizes the need to know both the enemy and your own forces.² The idea that logistics provides the key to operational flexibility is explored in some detail.³

JCS Pub 3-0: Doctrine for Unified and Joint Operations

This publication outlines doctrine governing the employment of the U.S. Armed Forces in unified and joint operations. Of primary importance in relation to the lessons learned, JCS Pub 3-0 outlines the strategic estimate process.⁴ In suggesting that the estimate addresses "all the considerations that adversely affect the attainment of objectives

throughout the operational continuum". It provides the commander with a framework to ensure the issues of geography, infrastructure, host-nation support, and prepositioning are considered.⁵ Within the discussion of CINC responsibilities in peacetime, the publication addresses the need for sound operational planning with an eye toward logistical considerations.⁶

Joint Pub 4-0: Doctrine for Logistic Support of Joint Operations

As the title implies, this publication contains guidance for conducting logistic support of joint operations. The discussion expands upon the logistics material covered in the other two publications with the addition of thoughts on the balance between combat and logistics forces in the theater.⁷ While introducing a number of critical areas to consider, one of the most useful is the discussion of the principles of logistics, which "provide guidance for organization, planning, management, and execution."⁸

Both JCS Pub 3-0 and Joint Pub 4-0 had already been circulated in test form prior to the force build-up in Saudi Arabia. Based on this brief look at these publications, it appears that those responsible for drafting the text were aware of the major issues which subsequently surfaced during the Gulf War and that this paper has highlighted as lessons. While a pessimist like Hegel would conclude that people had again failed to act on the principles derived from experience, a different interpretation might be in order. Joint Pub 4-0 proposes "that logistic principles require experienced application and are as much art as science."⁹ While the evidence presented points to the need for improvement in certain areas, the overall logistics effort was successful. Perhaps a more fitting conclusion is that our logistical "artists" are capable--they simply need some work on their technique.

CHAPTER V

CONCLUSION

In reviewing the volume of material generated on the logistics aspects of U.S. involvement in Desert Shield/Desert Storm, it becomes apparent that there are nearly as many interpretations of the facts as there are authors. In choosing to focus on this aspect of the operation, this paper attempted to highlight an area of the military art that historically has been overshadowed by some of warfare's more "glamorous" fields. This most recent application of U.S. military power, involving short-notice deployment of forces over vast distances to confront a large and well-equipped enemy, serves as a perfect illustration of the significant role logistics plays in modern warfare. While there are many more lessons of a strategic and tactical nature, the intent of this paper was to focus on those affecting the operational commander and their impact upon the successful employment of forces in pursuit of theater-level objectives.

Beginning with the concept of the "Logistics Snowball", the conclusion reached was that while it poses a problem the commander needs to consider, its presence is an unavoidable by-product of modern mechanized warfare. Although its effects can be minimized by careful planning, it will never be eliminated.

In reviewing the lessons to be drawn from the Gulf War, the paper considered the areas of planning, deployment, and sustainment. In planning, the key for the commander is to constantly question the state of affairs in his area of responsibility and ensure adequate consideration is given to all potential threats, not just those tasked from above. From the deployment phase the discussion centered on the fact that available lift will always fall short of what the commander would like in terms of being able to respond quickly to an emerging crisis. It is essential then that he know his potential enemies and the area in which he may be required to employ his forces in order to develop logistically-constrained courses of

action. With respect to sustainment, the infrastructure within the area of operations will have a significant impact on his ability to provide resupply and must guide his operational concept. Recognizing the need to respond quickly in times of crisis while constrained by available lift, prior arrangement of host-nation support agreements is vital. Given the impact logistics has on his ability to initiate and sustain combat operations, the commander must be aware of the ramifications a decision to increase combat troop strength at the expense of supporting forces will have. Finally, he must be familiar with existing service doctrine and how it will translate into his theater of operations. If there is a disconnect, timely efforts to compensate will avoid serious problems in the future.

The brief review of current joint publications revealed they adequately address all of the lessons discussed. That problems existed during operations in the Gulf, despite both JCS Pub 3-0 and Joint Pub 4-0 being available in test form at the time, can be attributed more to an understanding of the logistics field as a constantly developing art form than to any wholesale failure on the part of those involved. As Martin Van Creveld explains:

... It sometimes appears that the logistic aspect of war is nothing but an endless series of difficulties succeeding each other. Problems constantly appear, grow, merge, are handed forward and backward, are solved and dissolved only to reappear in a different guise. In face of this kaleidoscopic array of obstacles that a serious study of logistics brings to light, one sometimes wonders how armies managed to move at all, how campaigns were waged, and victories occasionally won.¹

NOTES

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17. U.S. Dept. of Defense, Conduct, p. F-34.
18. Dungan, p. 19.
19. Thompson, p. 286.
20. Collar, p. 67.
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